

REMARKS

Claims 1-39 are pending in this application. The office action dated December 27, 2002 rejected claims 1-39. Claims 1, 13 and 37 have been amended to correct any informalities and to further clarify the subject matter of the claimed invention. The specification has been amended as well to correct an informality. Also, proposed amendments to the drawings have been made to correct informalities. Additionally, new Claims 40-60 have been added to further clarify aspects of the claimed invention. No new matter has been added any of these amendments.

Drawings:

The drawings were rejected as failing to comply with the 37 CFR 1.84 (p)(5) because they have included reference signs not mentioned in the description. Figure 1 references 122 and 124, Figure 3c reference 158, Figure 3d reference 160, Figure 3e reference 133, Figure 12 references 364, 366, 368, and 370, and Figure 14 reference 376 have been stricken from the drawings in the attached proposed drawings. The applicants request approval of the proposed amendments to the original drawings.

Specification:

The disclosure was objected to because a brief summary of the invention is missing. Title 37 CFR 1.73 permissibly states a brief summary of the invention "should" be included. The omission of the summary is explicitly contemplated in the second sentence of the rule where it states, "Such summary, **when set forth, should...**" (emphasis added). Accordingly, applicants have not included a brief summary of the invention. The applicants request removal of the objection.

The disclosure has also been objected to because of an informality on page 10, line 3. Applicants have changed reference "150B" to "150A" as suggested by the office action. The applicants request approval of the change. No new matter has been added.

Claim Objections

Claim 13 was objected to because of an informality. Applicants have amended the claim to change the recitation of “ENDS” to “EDNS” as suggested in the Office Action. Applicants request approval of the amendment. No new matter has been added.

Claim Rejections – 35 USC § 102

Claims 1-7, 16-22, 30-33, and 37-39 have been rejected under 35 USC 102(a) as being unpatentable by U.S. Patent No. 5,774, 660 to Brendel et al (hereinafter, Brendel). Regarding Claim 1, the Office Action referenced a particular section of Brendel (Column 6, lines 20-26, and column 7, lines 19-23) that allegedly teaches each element of the claimed invention.

Amended Claim 1, subparagraph (b), teaches balancing the load on a plurality of servers by determining the load *out of band* for each of a plurality of servers that provide access to resources associated with a domain name and selecting one of the plurality of servers to provide the access based on a determination for optimally balancing the load on the plurality of the servers. Clearly, the claimed invention teaches using the domain name to select the server to optimally balance a load that is determined out of band, not in response to a particular request for access to an ip address. (Page 3, line32 through page 4, line 7).

In contrast, Brendel discloses maintaining a directory table of the locations of different files and resources on a web site and selecting a server based upon the locating of a server in a table that has resources that are specified in a user request (col. 10, lines 56-58). Nowhere in the cited reference is an out of band determination of a load on a plurality of servers suggested or disclosed. Thus, Brendel does not anticipate or make obvious at least this element of the claimed invention.

Likewise, Brendel does not disclose the claimed method for balancing the load on a plurality of servers by *resolving* an Internet protocol (IP) address of the selected server so that the accessing of the resources associated with the domain name will cause the load to be optimally balanced on the plurality of servers on a network as recited by the claimed invention. As commonly understood, the resolving step entails changing a domain name included with a request into a corresponding IP address that is provided in an response to the request. Further, the claimed invention provides for resolving an IP address that is associated with a selected

server in such a way as to enable the optimal balancing of the load on a plurality of servers if (not when) a client accesses the resource with the resolved IP address. (Page 6, lines 28-30.) Clearly, the claimed invention clearly does not provide for automatically initiating a connection to the resource in response to a domain name request as taught by the cited prior art.

In contrast, Brendel teaches a load balancer to decode a URL request to determine a requested resource and assigning the URL request to a node that contains the requested resource. Brendel further discloses automatically transferring the requesting client's connection and session set up to the assigned node, which reads and transmits the requested resource to the client. (Column 7, lines 1-13). Also, Brendel teaches employing the load balancer to transmit the request to a server that has the resources to handle a request in accordance with a table that lists the resources that are available on various servers (col. 10, lines 56-58). Thus, Brendel does not suggest or disclose optimally balancing the load on a plurality of servers on a network as taught by Claim 1, subparagraph (c).

Moreover, the amendment to Claim 1 is only provided to further clarify a limitation already taught and does not further limit the scope of the claimed invention. Therefore, for at least the reasons discussed above, amended Claim 1 is neither anticipated nor obvious in view of Brendel.

Regarding Claims 4-6, Brendel does not disclose or suggest when the primary DNS determines the domain name is delegated to a EDNS, enabling the primary DNS to refer the local DNS to the EDNS to resolve the ip address for the selected server. Nor does Brendel teach or make obvious employing the referred EDNS to use at least one of a plurality load balancing determinations to select one of the plurality of servers and resolve the ip address for the selected server. The specification teaches that the claimed extended DNS systems (Primary and Secondary EDNSs) are substantially different than a local or primary DNS system, such as that briefly mentioned in Brendel. In fact, the specification provides separate definitions to make the distinction clear between the different functions performed by DNS and EDNS systems. (Page 4, line 27 through page5, line 31). Additionally, Brendel teaches that a DNS system operates separately from a load balancer in both function and form. Thus, Claims 4-6 can not be

anticipated or obvious in view of Brendel and the other cited references at least in part because Brendel does not teach or suggest any load balancing performed by any form of a DNS system.

Regarding Claim 7, applicants submit that Brendel does not teach or suggest a primary EDNS to collect metric information employed by the selected load balancing determination to select the server to provide access to the resources associated with the domain name. Instead, Brendel discloses a completely different application, i.e., a load balancer, to perform resource-based load balancing to choose an assigned node. (col. 6, lines 53-58). Nowhere in Brendel is there any teaching or suggestion of the claimed operation of a DNS system, let alone an EDNS system. Thus, Claim 7 is neither anticipated nor obvious in view of Brendel or the other cited references.

Regarding Claims 16 and 17, Brendel does not teach using an EDNS or a server array controller as defined in the specification (Page 4, lines 10-18). Instead, Brendel discloses employing a load balancer that communicates over a local network by selecting NIC addresses (col. 10, lines 9-13). Therefore, Claims 16 and 17 are not anticipated or obvious in view of Brendel.

Regarding Claim 19, Brendel does not teach or suggest an agent program that collects the metric information and communicates the collected metric information to the EDNS when the EDNS is not resolving the ip address for the resources associated with the domain name request. Instead, Brendel teaches a load balancer that is a program (in an application layer above the TCP layer). Moreover, as discussed above, Brendel does not teach an EDNS system and certainly not any kind of DNS system that receives metric information collected by agent. Thus, Claim 19 is neither anticipated nor obvious in view of Brendel or any of the cited prior art references.

Regarding Claims 21 and 22, Brendel does not disclose the claimed wide ip data structure, which is described in the specification as a statement for mapping a domain name to a set of virtual servers managed by server array controllers and host machines. (Page 6, lines 20-33). Instead, Brendel discloses using a cached ip address to retrieve files from a remote server in a server farm. The cached ip address is used to initiate a communications session with a remote server (col. 2, lines 36-43). Clearly, Brendel does not disclose the claimed wide ip nor, as

discussed above, or an EDNS system. Therefore, Claims 21 and 22 are unanticipated, unobvious and allowable in view of Brendel.

Regarding Claim 30, Brendel does not teach the claimed wide ip statement as discussed above, and further does not disclose statistics that include:

- weighting values for the servers managed by a particular server array controller. Instead, Brendel generally discloses Internet servers (column 1 line 9) and does not disclose weighting values associated with these Internet servers .
- weighting values for the servers managed by another host machine. Instead, Brendel discloses generally a URL used for identifying the domain, a host within the domain, and sometimes a resource or file within a directory structure on the host computer (col. 1, lines 37-39). Again, Brendel does not disclose weighting values, including servers managed by another host machine.
- the number of successful from the domain name resolutions, the number of unsuccessful domain name resolutions. Instead, Brendel discloses generally that one DNS server may have to refer to another DNS for unknown host-names (column 2, lines 27-28). Thus, Brendel does not disclose this aspect of Claim 30.
- The load balancing modes used for the pool of servers managed by each server array controller, the load balancing modes used for the pool of servers managed by each host machine. Instead, Brendel discloses generally rotating DNS load-balancing (col. 3, lines 5-6) and does not disclose associating load balancing modes for pools of servers managed by the type of server array controller taught in the specification and discussed in greater detail above.
- The number of servers managed by each server array controller that are used to load balance a specified wide ip, and the number of servers managed by each host machine that are used to load balance the specified wide ip. Instead, Brendel teaches generally that each DNS in rotating DNS load balancing operate independently of other DNS servers (col. 3, lines 31-32).

Therefore, for at least the reasons presented above, Claim 30 is not anticipated or obvious in view of Brendel and the other cited references.

Regarding Claims 31 and 32, Brendel does not teach an EDNS (as discussed in detail above) or an iQuery protocol and agent as taught in the specification. (Page 6, lines 3-13). Instead, Brendel discloses generally that one DNS server may have to refer to another DNS for unknown host-names (column 2, lines 27-28), that other protocols can be used within a local area network (col. 10, lines 21-24), and that the load balancer may be a program (col. 23, line 51). Accordingly, Brendel and the other cited references do not anticipate or make obvious the claimed invention.

Regarding amended system Claim 37, Brendel does not anticipate or make obvious the claimed invention for at least the same reasons discussed in regard to method Claim 1. Also, in regard to Claim 38, Brendel does not teach or suggest the claimed EDNS as further defined in the specification and discussed in greater detail above. Furthermore, Claim 38 is not anticipated or obvious at least for substantially the same reasons as amended Claim 1.

Additionally, dependent claims 2-7, 16-22, 30-33, and 39 are submitted to be patentable over Brendel at least because of the reasons listed above and because the dependent claims depend from other claims that are submitted to be patentable.

Claim Rejections – 35 USC § 103

Claims 8-15, 23-29, and 34-36 have been rejected under 35 USC 103(a).

With regard to Claim 8, the office action stated that it would have been obvious to modify Brendel in view of Joffe et al. and further in view of Guenther et al. because “this allows the system to balance the load throughout the network.” Also, with regard to Claim 9, the office action states that it would have been obvious to modify Brendel in view of Hu and further in view of Shah et al. and Joffe et al. because “this is a way of balancing the load any network based on the current load information” and “[these] are techniques for dynamically load balancing a network.”

Although both Claims 8 and 9 depend on Claim 4, which teaches a domain name that is delegated to an EDNS system, the office action is silent on disclosing an equivalent to the EDNS system in the suggested combinations of Brendel, Hu, Shah et al. or Joffe et al. In regard to Claim 8, Brendel clearly teaches away from employing a round robin load balancing technique with a DNS system such as commonly employed on a router-based network.

It is desired to reduce the frequency of "SERVER NOT RESPONDING" messages that Internet users often receive. While many web sites use server architectures such as DNS round-robin and router-based load-balancing, a more efficient and fault-tolerant web-site architecture is desired. It is desired to avoid the data bottleneck and single point of failure at the router for router-based web sites. (Brendel, Col. 5, lines 55-59.)

In contrast, at least a portion of the static and dynamic load balancing determinations of Claims 8 and 9, i.e, topology, global availability, hops, and least connections are used in a router based and geographically distributed network. Significantly, Brendel teaches using a local area network to handle communications between the load balancer and servers from which resources are requested to address data bottlenecks and single points of failure within router-based web sites. (See col. 10, lines 8-24.) Further, if the teachings of Brendel were to be employed in the environment envisioned by the claimed invention, it would render the invention of Brendel unsuitable for its intended purpose because of the ensuing data bottlenecks and the single point of failure that would occur in a geographically distributed network, which by its very nature is router based. Thus, since the invention of Brendel teaches away from the suggested combinations with Hu, Shah et al. or Joffe et al., Claims 8 and 9 are non-obvious and allowable.

Regarding Claim 10, the office action stated that it would have been obvious to modify Brendel in view of Guenthner et al. because "this allows the system to choose the primary way of balancing the network." Also, regarding Claim 11, the office action states that it would have been obvious to modify Brendel in view of Guenthner et al. because "if the primary method is not successful with them the system is able to use an alternative method to balance the network." Further, regarding Claim 12, the office action states that it would have been obvious to modify

Brendel in view of Guenthner et al. because “if neither of the primary or alternate method is not successful in the system is able to use a fallback method to balance the network.”

In regard to the stated motivations for the suggested combinations of disparate prior art references for Claims 10-12, Brendel clearly does not suggest or teach primary and secondary load balancing determinations based on time stamped metric information for servers on a router based network where the servers are used to access resources that are associated with a domain name. As discussed above, if the teachings of Brendel were actually employed in the environment envisioned by the claimed invention, it would render the invention of Brendel unsuitable for its intended purpose because of the ensuing data bottlenecks and the single point of failure that would occur in a geographically distributed network, which are router based. Therefore, Claims 10-12 are non-obvious in view of the suggested combinations of prior art references and for at least the same reasons as independent Claim 1 upon which they depend.

Regarding Claim 13, the office action stated that it would have been obvious to modify Brendel in view of Shah et al. because “a DNS will be able to have quicker access to a EDNS.” Claim 13 is at least allowable because Brendel teaches away from load balancing on the kind of wide area network where the EDNS system operates and none of the cited references teach the the claimed EDNS.

Regarding Claim 14, the office action stated that it would have been obvious to modify the combination of Brendel and Shah et al. in view of Wallis because “this will help the system choose the most efficient server to balance the network.” Referring to Claim 15, the office action states that it would have been obvious to modify the combination of Brendel and Shah et al. in view of Wallis because “this will help the system choose the most efficient server to balance the network.” However, since none of the cited references teach or suggest the claimed EDNS system (secondary or primary) and Brendel teaches away from load balancing on a network where the claimed EDNS system operates, Claims 14 and 15 are non-obvious and allowable for at least this reason.

Regarding Claims 23, 24 and 29, the office action stated that it would have been obvious to modify Brendel in view of Wallis because “this allows the system to best determine what servers need a particular type of static or dynamic load balancing performed” and because “this

allows the system to best determine what servers need a particular type of static or dynamic load balancing performed.” Also, in regard to Claims 25 and 26, the office action stated that it would have been obvious to modify the combination of Brendel and Wallis in view of Shah et al. and Paul et al. because “this allows the system to best determine what servers need a particular type of static or dynamic load balancing performed.” However, Claims 23-26 and 29 are non-obvious and allowable at least because the suggested combinations fail to teach or suggest an EDNS system and its operation in a network as taught by the claimed invention.

Regarding Claim 27, the office action stated that it would have been obvious to modify combination of Brendel, Wallis, Shah et al., and Paul et al. (and in further view of Joffe et al.) because “this is important in determining how to best to balance the load of the network.” Claim 27 is at least allowable because the suggested combination does not teach a wide ip statement or an EDNS system as discussed in greater detail above.

Regarding Claim 28, the office action stated that would have been obvious to modify the combination of Brendel et al in view of Wallis as applied to claim 23, 24, and 29 above and further in view of Shah et al. and Hu because “this is important in determining how to best to balance the load of the network.” Further, in regard to Claim 34, the office action stated that it would have been obvious to modify the combination of Brendel in view of Wallis and further in view of Shah et al. and Hu as applied to Claim 28 above and further in view of Joffe et al. because “quality of service values and knowing that the topology of the network help to balance the load in efficient manner.” Also, regarding Claim 35, the office action stated that it would have been obvious to modify the combination of Brendel et al. in view of Wallis and further in view of Shah et al, Hu, and Joffe et al. in further view of Paul et al. because “this helps the system determine what metric information is more important in balancing the network load.” Additionally, referring to Claim 36, the office action stated that it would have been obvious to modify the combination of Brendel et al. in view of Wallis and further in view of Shah et al., Hu, and Joffe et al. in view of Paul et al. because “this helps the system determine what metric information is more important in balancing the network load.”

Dependent Claims 28, and 34-36 are at least allowable for the same reasons that the claims from which they depend are allowable, including that the suggested combinations of prior

art references fail to teach or suggest the claimed EDNS (primary or secondary) or dynamically load balancing servers on a router-based network where the servers are used to access resources that are associated with a domain name.

Accordingly dependent claims 8-15, 23-29, and 34-36 are non-obvious and patentable at least for the reasons presented above and because these claims depend from independent Claim 1, which is patentable.

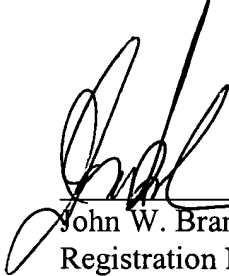
Conclusion

Applicants submit that all of the claims are in condition for allowance. Notice of such allowance is requested. The Examiner is invited to telephone the undersigned attorney for clarification of any of the amendments and remarks or to otherwise speed prosecution of this application.

The applicants have made proposed corrections to the drawings and have attached the proposed corrections hereto. Also, attached hereto is a marked up version of the changes made to the specification and claims by the current amendment. The attached page is captioned **"Version with markings to show changes made."**

Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Respectfully submitted,
MERCHANT & GOULD P.C.

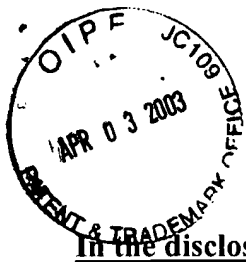

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PATENT TRADEMARK OFFICE



VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the disclosure:

Paragraph beginning at line 3 of page 10 has been amended as follows:

In FIGURE 3A, an overview ~~150B~~150A is shown of another embodiment of a WAN architecture that is somewhat similar to the network architecture shown in FIGURE 2 except that it includes multiple Primary DNS and Primary EDNS servers in separate geographically remote data centers. The transaction process is similar to the steps discussed above for FIGURE 2 except that each Primary EDNS server separately collects metric information out of band and each Primary DNS server is an authoritative source for zone information. At the data center 126 disposed in Seattle, Washington (seattle/domain.com), Primary EDNS and Primary DNS servers 152 are included in the same system. Also, Primary EDNS and Primary DNS servers 154 are included in the data center 138 located in New York, New York (newyork/domain.com). Both of these Primary DNS servers are authoritative sources for zone information that is used to resolve the client's domain name request. Each Primary EDNS system uses its separately collected metric information to perform the selected load balancing method and determine (resolve) an ip address for the client to optimally access resources associated with the requested domain name. Additionally, only one Host machine 120 is shown disposed at the data center 118 located in Tokyo, Japan (tokyo/domain.com).

In the claims:

Claims 1, 13 and 37 have been amended as follows:

1. Method for balancing the a load on a plurality of servers that provide access to resources associated with a domain name, comprising:

- (a) receiving a request for access to resources associated with the domain name;
- (b) determining the load out of band for each of a plurality of servers that provide access to resources associated with the domain name and selecting one of the plurality of servers to provide the access, the selection of the server being based on a determination for optimally balancing the load on the plurality of servers; and
- (c) resolving an Internet protocol (ip) address of the selected server so that the accessing of resources associated with the domain name at the resolved ip address of the selected server will cause the load to be optimally balanced on the plurality of servers on a network.

13. The method of Claim 7, further comprising a plurality of EDNSs that are separately disposed at a plurality of geographically distributed data centers, each data center including at least one of a server array controller, host machine and ~~END~~SEDNS.

37. A system for balancing ~~the~~a load on a plurality of servers that provide access to resources associated with a domain name, comprising:

- (a) a memory for storing logical instructions; and
- (b) a processor for executing the logical instructions stored in the memory, the execution of the logical instructions causing functions to be performed, including:
 - (i) receiving a request for access to resources associated with the domain name;
 - (ii) determining the load out of band for each of a plurality of servers that provide access to resources associated with the domain name and selecting one of the plurality of servers to provide the access, the selection of the server being based on a determination for optimally balancing the load on the plurality of servers; and
 - (iii) resolving an Internet protocol (ip) address of the selected server so that the accessing of resources associated with the domain name at the resolved ip address of the selected server will cause the load to be optimally balanced on the plurality of servers on a network.